



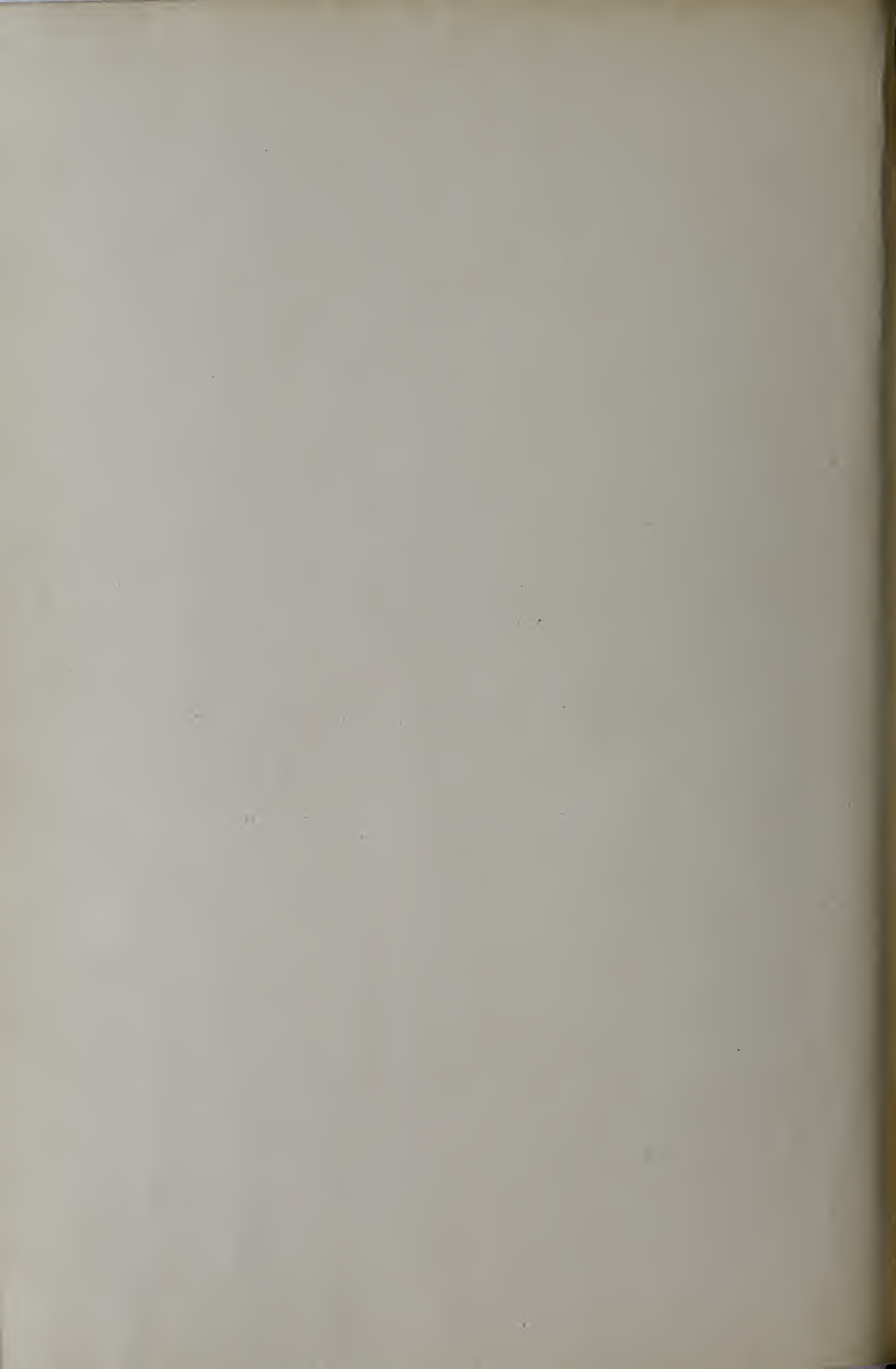
ON HÆMORRHAGIC CYSTS OF THE THYROID, WITH NOTES OF THREE CASES.

BY

E. W. ARCHIBALD, M.D., C.M.,

(Resident Surgeon, Royal Victoria Hospital,)

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In a recent number of the *Journal of Experimental Medicine*,¹ there appeared a very interesting and instructive paper by Dr. W. I. Bradley, embodying the result of a research upon the nature of certain cysts of the thyroid gland, the origin of which, he concluded, was hæmorrhagic.

During the past nine months we have had the opportunity of examining two cases of the same nature in the pathological department of the Royal Victoria Hospital,—one of these removed by Dr. Bell and one by Dr. Garrow. And as these specimens not only confirm the conclusions of Dr. Bradley, but also seem to elucidate some points left by him *sub judice*, I have ventured, under Dr. Adami's suggestion, to bring them before this Society.

Before reviewing Dr. Bradley's conclusions and remarking on the present specimens, it may not be out of place to mention a few points of interest in the history of the subject. I owe the information to Wölfler's work on operations upon the thyroid.²

Cysts have been extirpated since the time of Celsus,³ who recommended cutting down on them, and then either destroying them with caustics, or doing a blunt dissection of the intact cyst. His method of extirpation was followed by Galen,⁴ who drew attention to possible wounding of the great vessels and the recurrent nerve; by Aiteus,⁵ the Arab Albucasis and others of the dark and middle ages.

From the 13th to the 18th century, the operative treatment of these cysts seems to have been fairly common. Rulandus⁶ in the 13th century recommends the use of the seton and the hot iron, and draws attention to the necessity of extirpation of the whole capsule on account of the danger of recurrence. Laufrancus a little later advises simple incision and cleaning out of the cyst. The father of Scultetus opened a thyroid cyst and emptied the fluid contents—with successful result.

In the 18th century, Johann Astruc recommended puncture with the trocar for these cysts, and the seton when the contents are thick.

* Read before the Montreal Medico-Chirurgical Society, January 29th, 1897.

During this century, three main methods of operating upon thyroid cysts have been brought forward and advocated in turn by various surgeons. Mannoir, in 1799, and Velpeau, in 1843, advised puncture with injection of caustic agents. Then Beck in 1826 held out for simple incision of the cysts. Finally Scutin⁷ in 1833 revived extirpation, which had apparently fallen into disuse. But on account of the greater danger of sepsis, extirpation, until the age of antisepsis arrived, had to give way in the majority of instances to the former two methods.

It was perhaps from this cause that, until lately, little if anything, was written upon the histology of thyroid cysts. They were not taken out, and could therefore not be examined.

As Dr. Shepherd remarks in his article on the Surgical Treatment of Bronchocele "the "Enucleation" method was 'adopted first by Juillard, Rottman, and others, but to Prof. Socin¹¹ belonged the credit of first systematising the operation and bringing it prominently before the profession.' And it might be said, in parenthesis, that, on this side of the water, it was mainly Dr. Shepherd's article which drew attention to the value of enucleation as the operation of choice in these cases. Socin's work was only a little over 10 years ago. For some few years previous, I should add Wölfler had had numerous opportunities of examining thyroids, furnished him by Billroth's method of total extirpation. It is this method of enucleation which permits fuller histological study of these cystic cases.

However, cysts of hæmorrhagic origin seem in particular to have received very little attention, until Wölfler's work appeared in 1883. Rokitansky,⁹ in the forties, showed that thyroid hæmorrhages occurred for the greater part only in neoplastic thyroid tissue. Wölfler, after describing cyst-adenomata of the thyroid, and agreeing with Rokitansky that it is only in such tissue that hæmorrhages usually occur, goes on to say: "Such hæmorrhagic tumours, (he is referring to those produced by extensive hæmorrhage) it is, which, in the course of time, turn into thyroid cysts, the wall of which is formed by the cortex of the original adenomatous area, this cortex undergoing partial fibrous degeneration.

It is, however, with Wölfler's¹⁰ explanation of the origin of these hæmorrhagic cysts that Bradley disagrees.

In order to understand early the conclusions at which the latter arrived, it will be necessary to describe in some detail the histological structures of these cysts, as shown in his eight cases, and in the two cases which form the *raison d'être* of this paper.

The points on which is based the pathological diagnosis lie both in

the cyst-wall and the cyst contents. To quote Bradley : "The contents differ markedly from those of the ordinary vesicles of the thyroid gland. They are fluid, and in general present evidences of containing blood or derivatives from the blood ; they vary from a straw-coloured fluid, through greenish brown, to a dark brown grumous fluid ; or again, actual blood clots may be present. . . . They often contain leucocytes and cholesterin crystals.

With regard to the nature of the cyst-wall, this is of a somewhat peculiar character. Although very definitely fibrous in composition, it is not sharply defined. The layers composing it are not truly concentric ; here and there between them occur masses of small cells, which, by comparison with the tissues immediately outside the cyst-wall, are seen to be clearly the atrophied remains of gland tissue. These features explain why it is that in enucleation the cysts are found not to be sharply defined from their surroundings and permit successive irregular layers to be partially peeled off. The wall, in fact, passes gradually into the bands of interstitial tissue running between the surrounding collections of vesicles and evidently represents not so much a new formation of fibrous tissue around the cyst as a compression of the surrounding thyroid tissue. In the wall can be seen often here and there small areas of hæmorrhage, or pigmentation from old hæmorrhage. In the older cysts, judging from the thickness of the wall, it would appear that there had been a certain amount of new fibrous tissue formation.

Upon its inner aspect also the wall differs widely from that of an ordinary retention cyst ; it is not lined either with well-developed epithelium, or with the remains of such tissue ; while between the contained fluid and the fibrous envelope is to be found irregularly distributed a greater or less amount of intact gland tissue."

Then Bradley goes on to point out that the above mentioned characteristics clearly differentiate these cysts from the colloid retention cysts (called by Ziegler *Follicular* or *Dilatation* cysts) of *Struma Colloides* seu *Gelatinosa*. These never attain to any great size, their wall is covered with a continuous layer of epithelium, more or less flattened in different cases according to the amount of pressure exerted by the contents ; the wall outside the epithelial lining is thin and indefinite.

From the observation of all these particulars in his eight cases, he concludes that these cysts are due to "an accumulation in a lobule of the thyroid . . . associated with some destruction of gland tissue ;" that this destruction of gland tissue, in view of traces of pigmentation in the wall and in view of the nature of the contents,

is due to intravesicular and interstitial hæmorrhage ; which hæmorrhage is probably extensive, inasmuch as a small hæmorrhage would naturally result in a scar, while an extensive one would develop, as in the brain, into a hæmorrhagic cyst with fluid contents. He is led therefore to regard these large solitary cysts of the thyroid gland as being hæmorrhagic in origin.

Of course, Wölfler, with his extended opportunities of observing thyroids from Prof. Billroth's clinic, had not failed to comment on these cysts of the thyroid in which traces of hæmorrhage could be found. And Dr. Bradley gives him credit for this. We are confronted with a condition implying "destruction of thyroid tissue and accumulation of fluid in a space bordered by destroyed or partially destroyed vesicles." What is the cause at work leading to such destruction ?

"According to Wölfler "(I quote Dr. Bradley's words)" the main cause is an over secretion of colloid in the vesicles, with consequent rupture of these, infiltration of the interstitial substance with colloid material, atrophy of the infiltrated tissue, and subsequent continued excretion of colloid from such of the epithelial cells of the ruptured vesicles as remain undestroyed."

One further detail which Wölfler mentions, omitted but implied by Bradley, is that with this rupture of the vesicles there occurs also usually slight hæmorrhage. In short Wölfler's share in describing thyroid cysts, and the advance made by Bradley might be summed up, it seems to me, somewhat as follows :—

The former, in his chapters on "Hæmorrhages in Goître" and "Bursting of Vesicles. Goïtrous Cysts" liber cit. pp. 178-183 et 191-194, enumerates three ways in which cysts may develop.

1. As above stated, viz., by "by bursting of vesicles" with "simultaneous hæmorrhages, usually very slight" from the thin-walled new-formed vessels in the inter-acinous tissue ; "resulting in the formation of a cyst filled with colloid fluid more or less tinged with blood," (p. 193.) Such bursting of vesicles is only produced where colloid secretion is rapid and profuse.

2. Cysts may be formed by "confluence of vesicles" by a process analogous to that seen in the emphysematous lung. Here colloid secretion is gradual and slow. These, of course, are not hæmorrhagic.

3. By extensive hæmorrhage, inducing compression necrosis, and subsequent brown or yellow, soft, mushy masses (Erweichungsmassen), which finally become cysts filled with fluid contents.

All this, however, he sets down in the most unmethodical and obscure way—here a statement, there a statement ; here an observa-

tion, there an observation; here a fact, there a fact. So that one would search his work in vain for a paragraph or succession of paragraphs defining accurately as a class by itself these cysts of the thyroid due to hæmorrhages.

So much, nevertheless, he did write; so that he, as well as Dr. Bradley, described these cysts. Only the latter confines himself to cysts due to an extensive hæmorrhage (the contents having passed, as in the brain, through the stage of *erweichungsmassen* to that of more or less clear fluid), and does not recognise "bursting of the vesicles" as ever a possible cause; while Wölfler describes two kinds of hæmorrhagic cysts;—the one mainly colloid and very slightly hæmorrhagic, the other purely hæmorrhagic.

"Rupture of the follicles of a secreting organ (argues Bradley) as a result of overactivity is most rare. . . ." Secondly, the contents are not thick and colloid, but indicative of hæmorrhage. And in the third place hæmorrhages in the thyroid are of very frequent occurrence, while histological evidence of bursting of vesicles is wanting.

Hæmorrhage, then, is the immediate cause. What is the remote cause, the cause of the hæmorrhage? Of this Wölfler says nothing beyond noting the fact that the vessel walls in the adenomatous thyroid are extremely thin. Bradley goes much further. In his belief the causes are:

1. Increased size and increased vascularity of the adenomatous thyroid.
2. Its exposed position.
3. Vascular changes due to sexual disturbances, all three rendering the organ peculiarly liable to the fourth and immediate cause, traumatic rupture.

There were two points, however, which he professed himself unable to decide; the one, as to whether these cysts occur in and replace nodular adenomata of the gland tissue; the other, as to the true reason for that progressive enlargement in the early stages which is mentioned so frequently in the clinical reports.

It is upon these two questions that, as I believe, my specimens throw some light. They are taken from three cases—two operated on by Dr. Bell, and one by Dr. Garrow. The last is the one which demonstrates best the points in question, and I shall describe it in more detail than the others. An abstract of the clinical report (which I owe to Dr. Carron) is as follows:

"Mabel C., æt 16, admitted October 19, 1896. As long as patient can remember there has been some enlargement of the neck, but it was not until last spring that she noticed it was slightly larger, and

had become firmer than before. She says there has always been some enlargement of the tumour during the summer period, but the variations have always been slight. It has never caused any pain or inconvenience. Has been treated periodically since childhood with varying success; but always returned to original size in spite of all remedies applied.

Past history—Has had scarlet fever and inflammation of the lungs. Otherwise, always been healthy.

Family history—One brother and one sister of a family of eleven had tumours in the thyroid region. No tuberculosis nor cancer.

The tumour, as described by Dr. Carron, was as follows: The left lobe of thyroid gland is enlarged and prominent, filling out the depressions between sternum and clavicle. It is elastic on pressure, and feels quite tense and resisting. The whole mass is about the size of a hen's egg, but is flat and oval. The right lobe is also slightly enlarged, but this is quite distinct from the left side, and is not large enough to be very noticeable. Just above the extremity of left enlargement is a small mass about the size of a marble, which is separate from the large mass. There is no pain nor tenderness over the tumour, and the skin over it is quite normal. No murmur heard over it.

Operation, Oct. 21st—Incision made over large cyst in the left lobe; and after puncture and emptying of contents it was easily dissected out. The contents were grumous and of a greenish brown colour. Besides this large cyst there were found numerous small nodules in its neighbourhood, scattered through the thyroid tissue. These varied in size from that of a pea up to that of a small plum. Some were solid but of a soft consistency, and rather white in colour, and possessed very thin capsules, so that several were accidentally incised during the process of enucleation. Others were definitely cystic to the naked eye, with contents varying from a dark bluish or brownish fluid up to semi-solid masses of broken-down dark-coloured tissue. Perhaps a dozen or more of these small nodules and cysts were shelled out with ease, and, if I remember rightly, appearances at the operation indicated that there were many more similar nodules and cysts of a size too small to enucleate left in the gland.

When I came to examine these operation specimens in the pathological department, I was struck by the presence of a small nodule clinging to the outer wall of the main cyst; and in preparing the specimens for microscopical examination I took care to obtain sections through this portion, that is, through both cyst-wall and adherent nodule. The latter presented on section even macroscopically a cystic condition, with contents consisting of dark coloured fluid, in very small

quantity, and friable tissue. It is this specimen which, in particular, seemed to throw light on the points mentioned above. The histological examination revealed the following :

Section through the wall of the large cyst shows a dense, old-looking fibrous stroma with few proper connective tissue cells. It contains a few granules of blood pigment here and there, and rows of roundish and cuboid cells, evidently the remains of compressed and atrophied gland tissue. It is noticeable that these atrophied gland remains seem to be arranged as it were in layers, with dense fibrous tissue between and also that they seem on the whole to be more numerous and better preserved the nearer we get to the inner surface of the cyst.

Passing through the cyst-wall from inside to outside, and approaching the cystic nodule adherent to its external surface, we find the atrophied gland elements becoming more numerous, and the pigment granules, which were almost absent in the central layers of fibrous tissue, reappearing. The nodule we find to be composed of a small amount of adenomatous tissue, traversed by three or four bands of fibrous tissue in various directions. The vesicles are in the main large, and are partly filled with effused blood which is evidently no longer recent. Blood is also seen in the interstitial tissue. Clumps of pigment and large cells containing pigment granules can be seen in the fibrous tissue bands, especially along the edges ; also small collections of thyroid cells, possibly embryonic, more probably in the beginning stages of atrophy from compression ; all signs indicating hæmorrhage, not very old and yet no longer recent.

In the second case, that of a girl of 22, (whose clinical history yields no further feature of interest, except that growth of tumour was steady and not more rapid lately), the specimen as received by me consisted of a cyst about the size of a hen's egg attached firmly to a solid, congested, friable mass of about the same size, both being surrounded by one continuous capsule. The cyst, however, was separated from the solid body by its own capsule. There were several small calcareous masses in the wall of the cyst.

A section through the junction of the cyst and solid tumour shows the solid portion to be composed of ordinary adenomatous overgrowth without much increase in the colloid material. The cyst wall is composed of fairly dense fibrous tissue in which can be found scarcely any evidence of hæmorrhage. But, as one gets to the inner surface of the cyst wall, one comes on a very curious appearance, namely, four or five fairly distinct layers of alternate gland tissue (either embryonic or atrophied) and fibrous tissue showing traces of hæmorrhage. And quite on the inner side of the cyst wall the gland tissue

layers alternate, not with fibrous tissue, but with hæmorrhagic layers, the latter, however, not very recent.

In the third case, the specimens obtained showed only a condition of ordinary parenchymatous overgrowth, in which could be seen dotted all over the specimen clumps of pigment granules and large round cells filled with pigment granules, evidencing multiple minute hæmorrhages in the new formed adenomatous tissue.

All these histological appearances, it seems to me, not only lend support to Bradley's conclusions, but also decide to a certain extent the two points which he left *sub judice*.

First, do these hæmorrhagic cysts originate in previous nodular adenomata? Dr. Garrow's case would seem to show that they do, or may so originate; for here in addition to a large hæmorrhagic cyst we have a small well-defined nodular adenoma or parenchymatous hypertrophy of gland tissue, which is the seat of what I cannot but conclude to be an early stage of the process. In other words the organ which is the seat of a hæmorrhagic cyst shows also a nodular adenoma presenting both interstitial and intracystic hæmorrhage.

Secondly, what is the nature of the progressive enlargement of these cysts? We would, *a priori*, expect that a hæmorrhagic cyst should increase irregularly—by fits and starts; *i. e.*, that the enlargement should be due to successive hæmorrhages. Undoubtedly, judging from the history of several cases, such sudden considerable hæmorrhages do occur; but it is equally evident from other histories, or from the same history at different periods, that the enlargement is very frequently progressive. The condition of the accessory nodule in this case seems to aid us in understanding the process; for small as the nodule is, the evidences of hæmorrhage in it show that there has been, not one single large rupture of a vessel, but successive slight hæmorrhages, so small, some of them, that one might almost speak of it as an occasional oozing of blood. Nor is this progressive enlargement of a hæmorrhagic cyst unknown in other parts of the body. Othæmatomata are essentially hæmorrhagic cysts and they also have been noticed to undergo gradual enlargement.

The second case, with its layers of adenomatous tissue, hæmorrhage, and fibrous tissue, shows, I think, with some degree of probability, the occurrence of repeated slight hæmorrhages in the interior of hæmorrhagic cysts which have already attained some size, probably from the remains of thyroid tissue left jutting into the cyst after previous hæmorrhages.

It is, then, in regard to the cause of hæmorrhages in the thyroid, and also in differentiating these cysts more clearly than has hitherto

been done, making a distinct class of them, and giving a definite histological basis for the clinical facts, that Dr. Bradley's paper represents a considerable advance in our knowledge of the subject.

And, I think, that what has been said not only establishes his conclusions, but also lends strong support to the belief that one of the commonest forms of enlargement of the thyroid is due to a condition of localized adenomata of the gland tissue becoming the seat of repeated small, as well as of single extensive hæmorrhages.

In conclusion, I beg to express my thanks to Dr. Bell and Dr. Garrow for the material and the case reports upon which this paper is based and to Dr. Adami for advice throughout its course.

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